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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/725,441	12/03/2003	Jung-Chul Gong	053933-5057	5368
9629	7590	07/13/2005	EXAMINER	
MORGAN LEWIS & BOCKIUS LLP 1111 PENNSYLVANIA AVENUE NW WASHINGTON, DC 20004			RICHARDS, N DREW	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/725,441

Applicant(s)

GONG ET AL.

Examiner

N. Drew Richards

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-10 is/are pending in the application.
- 4a) Of the above claim(s) 8-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of claims 1, 2 and 4-7 in the reply filed on 4/21/05 is acknowledged.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites a junction depth for the n+ shallow junction layer. However, the units of measurement claimed are indefinite. It is unclear as to what unit of measurement is represented by the symbol "y" and as such the depth claimed is indefinite.

4. For the sake of the art rejections to follow, claim 6 is being interpreted as claiming a depth of 0.1 to 0.2 microns since that is the depth of the originally filed claim. Applicant is invited to amend the claim to read "0.1 to 0.2 micron" if that is the depth intended or to provide a clear explanation as to what the claimed unit of measure represents.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1, 4 and 7 are rejected under 35 U.S.C. 102(a) as being anticipate by Applicant's admitted prior art.

Applicant's admitted prior art (hereafter "APA") discloses in figure 1h and on pages 1-3, a light receiving element for blue rays comprising:

- A substrate 1;
- A p+ barrier layer (PBL) 2 buried in the substrate by a designated depth for serving as an anode for receiving a power provided from the exterior;
- A p-type epitaxial layer 3 formed on the p+ barrier layer by epitaxial growth, and provided with a depletion layer area for generating pairs of electrons-holes corresponding to energy of incident light from the exterior;
- A p+ well layer 4 formed on designated areas of the p-type epitaxial layer and electrically connected to the p+ barrier layer 2;
- A polysilicon layer 8 formed on window areas formed by window-etching an oxide layer 5; and
- A n+ shallow junction layer 7 diffused a designated depth for serving as a cathode for transmitting an electrical signal obtained by photoelectric conversion to the exterior;

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- Where the polysilicon layer 8 is overlapped with the oxide layer by a designated distance, and parts of the polysilicon layer and the oxide layer are removed.

It is noted that this claim contains product-by-process limitations such as epitaxial growth, masking, injecting an impurity, window-etching, and heating. Since the claims are drawn towards a product, the specific processes themselves bear no patentable weight since they don't structurally distinguish over the prior art. The final structure formed by the claimed process steps is anticipated by APA figure 1h and thus the claim is anticipated.

With regards to claim 4, as it depends from claim 1, non-removed portions of the polysilicon layer 8 on the window areas and the oxide layer 5 serve as external electrodes for receiving power provided from the exterior.

With regards to claim 7, as it depends from claim 1, the impurity ion forming the n+ shallow junction layer is one selected from phosphorous and arsenic.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art.

Claim 2 contains the same limitations as claim 1 and thus is rejected in a similar fashion to claim 1. Claim 2 also includes the limitation that the polysilicon layer is doped with an impurity. APA does not explicitly teach the polysilicon layer 8 being doped with an impurity. Nonetheless, Official Notice is taken that it would have been obvious to one of ordinary skill in the art at the time of the invention to dope the polysilicon layer. It is well known in the art to dope polysilicon with an impurity when, as in this case, the layer is used for electrical connection and conduction as it is well known that doping with an impurity such as boron, phosphorus or arsenic lowers the resistivity of the polysilicon layer.

With regards to claim 4, as it depends from claim 2, non-removed portions of the polysilicon layer 8 on the window areas and the oxide layer 5 serve as external electrodes for receiving power provided from the exterior.

With regards to claim 7, as it depends from claim 2, the impurity ion forming the n<sup>+</sup> shallow junction layer is one selected from phosphorous and arsenic.

9. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art as applied to claims 1, 2, 4 and 7 above, and further in view of Wang et al. (U.S. Patent No. 6,707,080 B2).

With regard to claim 5, as it depends from claim 1 or claim 2, APA is silent as to what impurity is injected into the p<sup>+</sup> well layer. APA teach forming the well layer as p<sup>+</sup>, but does not explicitly teach what impurity is used to dope the layer.

Wang et al. teach a light receiving device which includes p-type wells 13. Wang et al. also teach n-type regions 15 formed in the p-type wells for receiving light. Wang et al. teaches on column 5 first paragraph, implanting boron to form the p-wells. It would have been obvious to implant boron as taught by Wang et al. in the device of the APA to form the p+ well layer. It is well known in the art that there are a limited number of species that can be used to form a p-type region and the selection of the well known boron involves no inventive step. It would have been obvious to use a known material (boron) for it's known result in doping (to form p-type regions).

With regard to claim 6, as it depends from claim 1 or claim 2, APA does not teach the n+ shallow junction layer having a junction depth of 0.1-0.2 microns.

Wang et al. teach forming their n+ shallow junction layer 15 to a depth of **about** 0.05 to 0.1 micrometers (micron). This range overlaps the claimed range and thus renders the claimed range obvious. It would have been obvious to one of ordinary skill in the art at the time of the invention to form the n+ shallow junction layer to the claimed depth in order to improve the conversion efficiency for blue light.

### ***Conclusion***

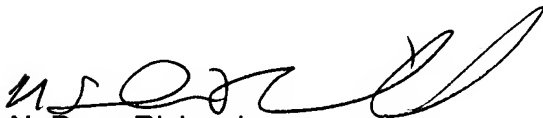
10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Chien et al. (US Patent No. 6353240B2), Harris (US Patent No. 6465862B1), Sverdrup, Jr. et al. (US Patent No. 6548751B2), Hong (US Patent No. 6756618B2), Koiwa (US Patent No. 6809391B1), Kozuka (US Patent No. 5690242B1), Morishita (US Patent No. 5500550).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to N. Drew Richards whose telephone number is (571) 272-1736. The examiner can normally be reached on Monday-Friday 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'N. Drew Richards', with a stylized flourish extending to the right.

N. Drew Richards  
AU 2815